

March 8, 2000

Docket No. 50-245

License No. DPR-21

Mr. S. E. Scace, Director  
Nuclear Oversight and Regulatory Affairs  
c/o Mr. D. A. Smith, Manager - Regulatory Affairs  
Northeast Nuclear Energy Company  
P.O. Box 128  
Waterford, Connecticut 06385

SUBJECT: NRC INSPECTION 50-245/99-13

Dear Mr. Scace:

On January 28, 2000, the NRC completed an inspection at your Millstone Unit 1 facility. The findings of the inspection were discussed with Mr. Larry Temple and others of your staff on February 10, 2000. The enclosed report presents the results of that inspection.

During the four month period covered by this inspection, your conduct of decommissioning activities at Millstone Unit 1 was characterized by appropriately focused safety-conscious operations, sound engineering and maintenance practices, and generally careful radiological work controls.

Based on the results of this inspection, the NRC has administratively closed 9 NRC open items due to the current decommissioning status of the unit. In addition, the NRC identified two Level IV violations of NRC requirements, both of which involved the failure to perform stack gas flow estimates every four hours as required by technical specifications, and are described in Licensee Event Reports. These two violations are being treated as a single Non-Cited Violation (NCV), consistent with Section VII.B.1.a of the NRC Enforcement Policy. The NCV is described in the enclosed inspection report.

If you contest the violation or severity level of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Millstone facility.

Mr. S. E. Scace

2

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room (PDR).

Sincerely,

*/RA/*

Ronald R. Bellamy, Chief  
Decommissioning and Laboratory Branch  
Division of Nuclear Materials Safety

Docket No. 50-245

Enclosure: NRC Inspection Report No. 50-245/99-13

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3

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**U.S. NUCLEAR REGULATORY COMMISSION  
REGION I**

**INSPECTION REPORT**

Inspection No. 50-245/99-13

Docket No.: 50-245

License No.: DPR-21

Licensee: Northeast Nuclear Energy Company

Location: Waterford, CT 06385

Facility: Millstone Nuclear Power Station, Unit 1

Inspection Dates: October 5, 1999 - January 28, 2000

Inspectors: P. C. Cataldo, Resident Inspector, Unit 1  
T. J. Jackson, CHP, Health Physicist  
A. Dimitriadis, Health Physicist

Approved by: Ronald R. Bellamy, Chief  
Decommissioning and Laboratory Branch, DNMS

## **EXECUTIVE SUMMARY**

Millstone Nuclear Power Station  
NRC Inspection No. 50-245/99-13

This integrated inspection included aspects of licensee operations, maintenance, engineering, and plant support during decommissioning activities. The report covers a four-month period of announced inspections by the Resident Inspector and two regional inspectors. One non-cited violation was identified.

### **Operations**

The licensee's performance during the movement, packaging, and subsequent shipment of the 184 new fuel assemblies removed from storage in the spent fuel pool was very good, with no safety significant issues identified. (O1.1)

The inspector concluded that the licensee has conducted decommissioning activities in a manner that assured continued safe storage of spent fuel in the Unit 1 spent fuel pool. (O2.1)

The inspector concluded that the licensee's cold weather preparations were completed satisfactorily. Although procedural compliance and work control deficiencies were identified, the inspector determined there was no significant impact on the plant, and the licensee appropriately addressed the identified issues. (O3.1)

The inspector concluded that the licensee's cancellation of a large number of unit-specific procedures was conducted satisfactorily, and appropriate programs, policies, and procedures have been established consistent with the decommissioning status of the unit. (O3.2)

The inspector determined that the identified open items could be administratively closed because the Unit 1 plant status had changed from an operational to a decommissioning status, and the licensee had taken adequate action to resolve the issues. In addition, while two examples of a non-cited violation were identified regarding the failure to perform compensatory actions as required by technical specifications, the licensee's corrective actions have been implemented and are considered acceptable. (O8.1)

The inspector concluded that the licensee has both established and adequately implemented a comprehensive program for the transition of structures, systems, and components from an operational status to a decommissioning status. (O8.2)

### **Maintenance**

The inspectors concluded that the licensee adequately planned and executed the control rod drive mechanism support steel removal, and the withdrawal and uncoupling of all control rods. (M1.1)

The inspector concluded that while procedural and human error issues were identified that led to the subsequent diesel fire pump discharge relief valve header drainage problem, the licensee

exhibited a good, comprehensive troubleshooting regime in their search for, and resolution of, the drainage problem. (M2.1)

## **Engineering**

The inspector concluded that the licensee had appropriately included Unit 1 within the scope of the site-wide Year 2000 (Y2K) Program, and all applications and devices associated with the safe storage of spent fuel were Y2K compliant. (E2.1)

## **Plant Support**

The licensee provided good radiological controls during the decommissioning work in the restricted and unrestricted areas. The licensee has established a comprehensive survey and dosimetry program that complements the ALARA program to minimize exposure. (R1.1)

The licensee provided adequate radiation postings and labeling throughout the site. High radiation area access and radiation exposure controls were effectively implemented, as evidenced by use of postings, locked doors, and a well-trained radiation protection staff. (R1.2)

Acceptable engineering support was noted in the licensee's efforts to repair the waste discharge line and various other radwaste equipment. The inspector noted that the licensee staff worked well together in the identification of the project critical path, the resolution of emergent issues, and toward the ultimate resolution of the historical deficiencies of the liquid waste management system. (R2.1)

The licensee's ALARA program and advance planning to determine the approach to performing work for the shutdown steel removal were good. The inspector identified no problems in the licensee's dose assessment for calculating personnel radiation exposures for the work. (R8.1)

The inspector concluded that the licensee adequately responded to contamination events that were identified during the control rod drive removal project. In addition, although minor inconsistencies in radiation protection documentation and communications were identified, these inconsistencies did not prevent the ultimate identification of the contaminations, and the licensee's corrective actions were considered acceptable. (R8.2)

The inspector concluded that the licensee responded appropriately to the off-site fire that affected Millstone Station transmission lines. In addition, the licensee had identified a number of improvement areas, including the impact of Unit 1 decommissioning on event coordination, which are being tracked in their corrective action program for resolution. (P1.1)

The inspector determined that the licensee's de-vitalization of plant areas was acceptable, given the decommissioning status of the unit, the continued physical location of the Spent Fuel Pool within the protected area (Reactor Building), and is consistent with the requirements as set forth in 10 CFR 73 and guidance contained in NRC Regulatory Guide 5.65, Section C.2. (S1.1)

The inspector reviewed recent revisions to the licensee's Station Security Department Instructions, and they were found acceptable. (S3.1)

## **TABLE OF CONTENTS**

<b>EXECUTIVE SUMMARY</b>	ii
<b><u>I. Operations</u></b>	<b>1</b>
<b>O1 Conduct of Operations</b>	<b>1</b>
O1.1 <u>New Fuel Packaging and Shipment</u>	1
<b>O2 Operational Status of Facilities and Equipment</b>	<b>3</b>
O2.1 <u>Spent Fuel Pool Operations</u>	3
<b>O3 Operations Procedures and Documentation</b>	<b>3</b>
O3.1 <u>Cold Weather Preparations</u>	3
<b>O8 Miscellaneous Operations Issues</b>	<b>5</b>
O8.1 <u>Inspection Of Open Items</u>	5
O8.2 <u>System Declassification and Abandonment</u>	7
<b><u>II. Maintenance</u></b>	<b>8</b>
<b>M1 Conduct of Maintenance</b>	<b>8</b>
M1.1 <u>Control Rod Drive Mechanism (CRDM) Removal Project</u>	8
<b>M2 Maintenance and Material Condition of Facilities and Equipment</b>	<b>9</b>
M2.1 <u>Fire Water System Drain Blockage</u>	9
<b><u>III. Engineering</u></b>	<b>10</b>
<b>E2 Engineering Support of Facilities and Equipment</b>	<b>10</b>
E2.1 <u>Year 2000 Program Review</u>	10
<b><u>IV. Plant Support</u></b>	<b>11</b>
<b>R1 Radiological Protection and Chemistry (RP&amp;C) Controls</b>	<b>11</b>
R1.1 <u>Personnel Radiation Protection and Contamination Control</u>	11
R1.2 <u>Postings and Labeling</u>	12
<b>R2 Status of RP&amp;C Facilities and Equipment</b>	<b>13</b>
R2.1 <u>Radioactive Waste Management</u>	13
<b>R8 Miscellaneous Radiological Protection and Chemistry Issues</b>	<b>14</b>
R8.1 <u>ALARA Planning and Internal Dose Assessment</u>	14
R8.2 <u>Personnel Contamination Events</u>	15
<b>P1 Conduct of Emergency Preparedness Activities</b>	<b>16</b>
P1.1 <u>Response To Off-Site Fire</u>	16

<b>S1</b>	<b>Conduct of Security and Activities</b>	17
S1.1	<u>De-Vitalization of Selected Unit 1 Areas</u>	17
<b>S3</b>	<b>Security and Safeguards Procedures and Documentation</b>	17
S3.1	<u>Review of Selected Security Procedures</u>	17
<b>V.</b>	<b><u>Management Meetings</u></b>	17
<b>X1</b>	<b>Meeting Summaries</b>	17
X1.1	<u>Millstone 1 Decommissioning Advisory Committee</u>	17
X1.2	<u>NRC Meeting With Town of Waterford First Selectman</u>	17
X1.3	<u>Exit Meeting</u>	18
	<b>PARTIAL LIST OF PERSONS CONTACTED</b>	19
	<b>INSPECTION PROCEDURES USED</b>	19
	<b>ITEMS OPENED, CLOSED, AND DISCUSSED</b>	20
	<b>LIST OF ACRONYMS USED</b>	21



## **Report Details**

### **Summary of Unit 1 Status (71707,71801)**

Millstone Unit One was shutdown on November 4, 1995, and all fuel removed from the reactor vessel and placed into the spent fuel pool (SFP) by November 19, 1995. The licensee decided on July 17, 1998, to permanently cease any further operation of the plant and informed the NRC of the decision by letter dated July 21, 1998. On October 1, 1999, inspection responsibility for Unit One was transferred from the Division of Reactor Projects to the Decommissioning and Laboratory Branch, Division of Nuclear Materials Safety, within NRC Region I. This integrated inspection report is the first report issued since that transfer of responsibility.

At Unit 1, the licensee has safely conducted decommissioning activities with no significant safety issues identified to date. While both the control room staffing and the number of operational systems important in the current decommissioning state have decreased, operators have maintained appropriate focus on these systems. In addition, with the NRC's issuance of the Permanently Defueled Technical Specifications (PDTs), the licensee has maintained adequate focus on PDTs compliance, especially with systems that have operational impact on Units 2 and 3. Major activities completed during the inspection period include: shipment of new fuel to an off-site fuel vendor; removal of under-vessel control rod drive support steel and other activities to support the control rod drive removal project; and re-characterization of a number of plant systems, structures, and components consistent with the decommissioning status of the unit. The licensee continued activities to separate Unit 1 systems from Units 2 and 3. The licensee has also appropriately prioritized emergent issues for resolution, particularly when Units 2 and 3 have been impacted. In general, while the unit's radiation protection program has been appropriately administered, a number of incidents regarding inadequate or inappropriate radiation worker practices have been identified. However, the licensee has initiated appropriate corrective action to address the issues, including the initiation of both internal and external self-assessments of the radiation protection program.

## **I. Operations**

### **O1 Conduct of Operations**

#### **O1.1 New Fuel Packaging and Shipment**

##### **a. Inspection Scope (60710)**

The inspector reviewed the licensee's preparation, movement, and packaging of new fuel for subsequent shipment off-site.

##### **b. Observations and Findings**

As discussed in NRC Inspection Report 50-245/99-09, the licensee had satisfactorily prepared for the removal of the new, unused fuel from the SFP to the New Fuel Storage Vault (NFSV). In October - November, 1999, the licensee removed the 184 fuel assemblies from the NFSV, successfully packaged and subsequently shipped them off-site to a fuel vendor.

The licensee conducted appropriate surveys to maintain radiation exposure As Low As Reasonably Achievable (ALARA), and also provided the required radiation data for the fuel channels and fuel assemblies to support the subsequent shipments to the appropriate off-site vendors. The Radiation Protection and Waste Services staff provided excellent support during all phases of the evolution, as evidenced by the absence of personnel contamination events for such a complex, repetitive evolution.

The packaging and shipping of the new fuel was performed with the appropriate quality assurance inspections, and in accordance with the applicable Department of Transportation and NRC regulations. All six shipments of new fuel assemblies were transported by truck with the appropriate attention to emergency preparedness requirements. In addition, by November, 27, 1999, all shipments had been received satisfactorily at the vendor's facility in Washington state. Appropriate transportation placards and radioactive shipment labels were observed by the inspector during the course of the packaging and shipment. In addition, the inspector observed a number of final shipment surveys and found these to be completed satisfactorily, with all required data recorded to fulfill shipment requirements.

Equipment and safety near-misses did occur, however, during the course of the evolution. For example, during the transport of a fuel assembly from the SFP to the NFSV, the reactor building crane auxiliary hook continued to drift downward and resulted in the fuel assembly contacting the floor. The licensee immediately responded to this event and appropriately placed the fuel assembly in a safe condition, terminated the evolution, and performed troubleshooting on the control circuitry to identify the cause of the drift. While no cause was found for the drift of the auxiliary hook, the hook anomaly did not occur for the remainder of the fuel movements.

The safety near-miss involved the potential injury to the foot of a worker. Specifically, while the refueling bridge was being moved during the transport of a fuel assembly in the SFP, a worker's foot became caught between the leading edge of the refueling bridge and a handrail base. The bridge was immediately stopped and the worker's foot was released, the fuel assemblies were placed in a safe condition, and appropriate briefings were conducted regarding the appropriate focus on safety. The licensee also decided to prohibit simultaneous movement of fuel assemblies inside and outside the SFP. The inspector found the licensee's actions in response to these events to be adequate, and provided appropriate focus on the importance of safety during the evolutions.

c. Conclusions

The inspector concluded that the licensee's performance during the movement, packaging, and subsequent shipment of the 184 new fuel assemblies was very good, with no safety significant issues identified.

## **O2 Operational Status of Facilities and Equipment**

### **O2.1 Spent Fuel Pool Operations**

#### **a. Inspection Scope (60801)**

The inspector reviewed the licensee's activities regarding the continued safe storage of spent fuel in the SFP.

#### **b. Observations and Findings**

The inspector determined that the licensee has generally maintained an appropriate focus on the safe storage of spent fuel in the SFP. This is demonstrated, for example, by: (1) safety evaluations conducted in support of decommissioning activities have appropriately addressed fuel handling accidents, heavy loads, and other potential issues regarding the continued, safe storage of spent fuel in the SFP, and remain consistent with 10 CFR 50.59 requirements; (2) the inspection of leak detection equipment in the reactor building has continued, however, the licensee has identified some issues relative to the adequacy of tank level monitoring that are currently being evaluated; (3) to ensure adequate makeup water is available in the event of a major loss of SFP inventory, operating procedures have been revised consistent with the operational status of systems associated with the SFP; and (4) the licensee has maintained appropriate focus on SFP safety during various reactor building crane operations, as well as new fuel movements in recent months. In addition, the licensee has continued to ensure adequate chemistry controls are utilized in the SFP. For example, the measurement of silica concentration is utilized to provide indication of boraflex degradation, since boraflex is used in the construction of various SFP racks that provide reactivity controls for the spent fuel in the SFP.

#### **c. Conclusions**

The inspector concluded that the licensee has conducted decommissioning activities in a manner that assured continued safe storage of spent fuel in the Unit 1 spent fuel pool.

## **O3 Operations Procedures and Documentation**

### **O3.1 Cold Weather Preparations**

#### **a. Inspection Scope (71714)**

The inspector reviewed the licensee's activities regarding protection of plant equipment from cold weather.

#### **b. Observations and Findings**

The inspector reviewed the licensee's cold weather preparations, which were accomplished in accordance with procedure OP 213, "Cold Weather Preparation," and its predecessor, Operations Manual Section 3.11, "Cold Weather Preparation and

Operation.” In general, the inspector found that the licensee completed cold weather preparations satisfactorily with a few exceptions. Procedure OP 231 requires deficiencies or potential freezing problems to be identified and acted upon prior to October 1. However, contrary to this requirement, two issues were identified but completed late:

- a. The licensee initially was unable to provide steam heating to Unit 2, especially for external tanks such as the refueling water storage tank. The inability to provide steam was due to the isolation of steam supply (to Unit 2) and condensate return piping (to Unit 1), following the identification that a potential existed for hydrazine and ethanolamine (authorized Unit 2 chemicals) to migrate into Unit 1 systems, and eventually be discharged from an unauthorized discharge path. However, the licensee initiated a new sampling regime, and the State of Connecticut's Department of Environmental Protection subsequently issued an Emergency Authorization that would permit the discharge if it were to occur. The inspector determined that temperatures associated with the critical Unit 2 external tanks never violated the minimum technical specification (TS) acceptance criteria, and the Unit 1 steam heat was eventually restored to Unit 2.
- b. The licensee had appropriately identified that certain portions of the condensate water transfer pump discharge header piping lacked thermal insulation. However, while the piping had functional heat tracing, cold weather subsequently caused a check valve in the header to freeze and crack. Inadequate work control planning and execution contributed to a delay in the application of thermal insulation, which resulted in the valve failure. The licensee subsequently performed the necessary repairs. The inspector determined that while a failure did occur, the overall impact on plant operations was minimal.

c. Conclusions

The inspector concluded that the licensee's cold weather preparations were completed satisfactorily. Although procedural compliance and work control deficiencies were identified, the inspector determined there was no significant impact on the plant, and the licensee appropriately addressed the identified issues.

O3.2 Cancellation of Site Procedures

a. Inspection Scope (42700)

The inspector reviewed the licensee's processes and procedures during the transition from site-wide operational programs to Unit One-specific decommissioning programs, which included the cancellation of a large number of unit procedures.

b. Observations and Findings

Following the NRC's issuance of the PDTS in November, 1999, the overall change to decommissioning status of Unit 1, and the licensee's issuance of the Defueled Safety Analysis Report, a number of procedures were appropriately revised or canceled by the licensee. These procedures were revised or canceled after comments and feedback were obtained from the affected Unit 1 departments, such as Operations and Maintenance.

While the site-wide program for procedure revision and cancellation was initially utilized, the licensee has established Unit One programs, policies and procedures consistent with the decommissioning status of the unit. These new programs, policies, and procedures will be utilized during the decommissioning process, including future revisions to Operations Department procedures.

c. Conclusions

The inspector concluded that the licensee's cancellation of a large number of unit-specific procedures was conducted satisfactorily, and programs, policies, and procedures have been established consistent with the decommissioning status of the unit.

**O8 Miscellaneous Operations Issues**

O8.1 Inspection Of Open Items

a. Inspection Scope (92700)

The inspector reviewed the current NRC open item list to determine which items could be closed, and also to address and disposition violations of NRC requirements.

b. Observations and Findings

Closure of Open Items:

The inspector reviewed current NRC open items at Unit 1, and has identified several items that can be administratively closed due to the following: (1) The licensee had certified in July 1998, in accordance with 10 CFR 50.82(a)(1)(i) and (ii), that they had permanently ceased operations and that fuel had been permanently removed from the reactor vessel; (2) The fundamental performance issues related to the violations identified from Licensee Event Reports (LERs) listed in Table One are similar or common to the performance issues dispositioned by the NRC in both the Exercise Of Enforcement Discretion, dated April 16, 1998, and the Notice of Violation and Proposed Imposition of Civil Penalties dated December 10, 1997; and (3) The licensee had entered the issues associated with the LERs into their corrective action program, and adequate corrective actions have been completed.

**Table One: NRC Open Items - Administratively Closed**

LER 50-245/96-33-00	LER 50-245/96-33-01	LER 50-245/96-34-00
LER 50-245/96-43-00	LER 50-245/96-65-00	LER 50-245/97-19-00
LER 50-245/97-20-00	LER 50-245/97-33-00	LER 50-245/97-37-00

(Closed) Licensee Event Reports 50-245/96-42-00, and 50-245/99-01-00: Stack Gas Sample Flow Surveillance Missed.

In June, 1996, and August, 1999, the licensee identified that compensatory actions to estimate Unit 1 stack flow rate every four hours had not been performed as required by technical specifications (TS). Specifically, Unit 1 TS 3.8.B.1, Table 3.8-2, Item 3 (d), Action E, required, in part, that with the stack flow rate monitor not operable, "that the flow rate is estimated once every four hours." However, in 1996 and 1999, the licensee identified that the required reading was obtained approximately 1 hour and 30 minutes late, and 20 minutes late, respectively.

The licensee in both cases instituted appropriate corrective actions and entered the issue into their corrective action program. The inspector determined that the violations occurred apart in time and indicates the failure to perform the flow rate estimation were separate isolated occurrences.

The failure to estimate the stack flow rate every four hours is a violation of TS 3.8.B.1, Table 3.8-2, Item 3.(d). This Severity Level IV violation is being treated as a Non-Cited Violation consistent with Section VII.B.1.a of the NRC Enforcement Policy which permits closure of most Severity Level IV violations based on the issue being entered into the licensee's corrective action program. These issues were entered as Adverse Condition Report M1-96-0059, and Condition Report M1-99-0368. In addition, as this issue relates to Unit 2 TS 3.3.3.10, Table 3.3-13, and Unit 3 TS 3.3.3.10, Table 3.3-13, which are corresponding TSs for the Unit 1 stack flow rate monitor, the issue will be addressed in NRC Inspection Report 50-336,423/00-01.

The licensee identified in June, 1996, and August, 1999, that compensatory actions to estimate Unit 1 stack flow rate every four hours had not been performed as required by technical specifications. This is a violation of NRC requirements, and is being treated as a **Non-Cited Violation (NCV 50-245/99-13-01)**. As a result, LERs 50-245/96-042-00 and 50-245/99-01-00 are considered **closed**.

c. Conclusions

The inspector determined that the identified open items could be closed because the Unit 1 plant status had changed from operational to decommissioning status, and the licensee had taken adequate action to resolve the issues. In addition, while two examples of a non-cited violation were identified regarding the failure to perform compensatory actions as required by technical specifications, the licensee's corrective actions have been implemented and are considered acceptable.

## O8.2 System Declassification and Abandonment

### a. Inspection Scope (71801)

The inspector reviewed the licensee's process for re-classification and abandonment of structures, systems and components (SSCs) consistent with the decommissioning status of the unit.

### b. Observations and Findings

To facilitate the decommissioning process, the licensee established the System Evaluation Re-Characterization Team (SERT). The SERT evaluates all SSCs for either abandonment or continued availability to support: (1) the current licensing and design basis; (2) the safe storage of fuel in the SFP; (3) the decommissioning of the unit; and (4) the operation of Units 2 and 3. Decommissioning procedures DEC 1502, "System Evaluation and Categorization," and DEC 1503, "System Transition Process," were established for the performance of the SSC evaluations, as well as the subsequent transition once an SSC has been scheduled for abandonment.

The inspector reviewed a number of SSCs that have been evaluated by the SERT, including SSCs that have been re-characterized as abandoned. SSC evaluations have been comprehensive with appropriate attention given to issues such as personnel safety, potential interaction issues with inter-connected systems, system boundary issues, and whether the system supports the operation of Units 2 and 3. The 10 CFR 50.59 screening and safety evaluations have adequately supported the evaluation results for the SSC packages that were reviewed by the inspector. In addition, licensee personnel familiar with Unit 1 systems have been utilized in support of the transition process, which has facilitated the system transition, i.e., venting and draining of control rod drive hydraulic control units. The inspector identified no safety concerns.

### c. Conclusions

The inspector concluded that the licensee has both established and adequately implemented a comprehensive program for the transition of structures, systems, and components from an operational status to a decommissioning status.

## II. Maintenance

### **M1 Conduct of Maintenance**

#### **M1.1 Control Rod Drive Mechanism (CRDM) Removal Project**

##### **a. Inspection Scope (71801, 60801)**

The inspector reviewed the licensee's activities regarding the CRDM removal project.

##### **b. Observations and Findings**

In support of the decommissioning process, the licensee developed a two-phase approach to the CRDM removal project. Specifically, phase one involved activities such as the removal of the under-vessel control rod drive support steel, or shootout steel, and the withdrawal and subsequent uncoupling of the control rods. Phase two of the project will cover the actual removal of the CRDMs, the placement of blank flanges on the reactor vessel, and the shipment of CRDMs off-site. Phase one was reviewed during this inspection period.

During phase one of the project the inspectors observed the licensee and contractor perform a portion of a mock removal of a CRDM from the drywell. The licensee planned the mock-up to assess any additional planning or work items that might be needed to adequately perform the evolution. In addition, the licensee:

- Satisfactorily removed the under-vessel CRDM support steel, which was accomplished with the assistance of an experienced contractor.
- Adequately performed the required pre-job briefs with the appropriate personnel, and included the appropriate topics, i.e., radiological protection standards and procedures, operational constraints and support, personnel and industrial safety issues, and others. An inspector observed a pre-job meeting that was held in the reactor building/drywell entrance prior to the start of a mock-up training session. During this meeting, appropriate radiological and occupational safety items were reviewed with the applicable personnel. In addition, during the post-job review, the inspector discussed various aspects of the ALARA program with two of the radiation workers. Based on these discussions, it appeared that the workers adequately understood the ALARA program and were actively involved.
- Utilized good coordination between Operations and contractor personnel and during the control rod withdrawal and uncoupling, which involved numerous and repetitive valve manipulations that were performed without incident.
- Provided adequate radiation protection support during all portions of phase one of the CRDM project, however, personnel contamination events did occur that revealed some weaknesses in the program (these are discussed in Section R8.2).



c. Conclusions

The inspectors concluded that the licensee adequately planned and executed the control rod drive mechanism support steel removal, and the withdrawal and uncoupling of all control rods.

**M2 Maintenance and Material Condition of Facilities and Equipment**

M2.1 Fire Water System Drain Blockage

a. Inspection Scope (71801)

The inspector reviewed the licensee's actions following the identification of a suspected blockage in a fire water system relief valve drain header.

b. Observations and Findings

In December, 1999, the licensee identified that the diesel fire pump (DFP) discharge header relief valve drain line could not adequately accommodate the expected discharge of water during the weekly DFP operational test. The potential impact from the water that subsequently accumulated resulted in the DFP being declared inoperable. The licensee entered the appropriate PDTS action statement, and notified Units 2 and 3.

During the investigation that followed, the licensee eliminated possible causes of the blockage through the following actions: (1) the excavation of a discharge line check valve revealed some valve degradation, but no obstructions that could have caused the inadequate drainage; (2) remote camera inspections were performed of the entire relief valve discharge line that revealed some debris, although not enough to cause the observed inadequate drainage; (3) removed and tested the DFP relief valve satisfactorily; and (4) evaluated the DFP operational data, which initially indicated no unusual parameters that would lead to the observed drainage issues.

Subsequent evaluations revealed that the DFP speed as measured from the installed tachometer (uncalibrated) was reading lower than actual speed when compared to a calibrated hand-held tachometer. When the licensee adjusted the speed to the normal band, the drainage problem was alleviated. Preliminary evaluation has revealed that procedural inadequacies and operator error led to the incorrect DFP speed setting. A procedure revision was performed that would prevent the DFP governor speed setting from being adjusted in a manner that would initiate further drainage issues. The licensee has established an adequate operability basis for the continued use of the DFP, and the corrective action process will be used to track this issue through to ultimate resolution.

c. Conclusions

The inspector concluded that while procedural and human error issues were identified that led to the subsequent diesel fire pump discharge relief valve header drainage problem, the licensee exhibited a good, comprehensive troubleshooting regime in their search for, and resolution of, the drainage problem.

### **III. Engineering**

#### **E2 Engineering Support of Facilities and Equipment**

##### **E2.1 Year 2000 Program Review**

a. Inspection Scope (TI 2561/003)

The inspector reviewed the licensee's Year 2000 (Y2K) program activities for Millstone Unit One, in accordance with the guidance provided in Temporary Instruction (TI) 2561/003, "Re-Examination Of Year 2000 (Y2K) Program Activities At Selected Decommissioning Reactors."

b. Observations and Findings

The inspector reviewed the licensee's Y2K program for Millstone Unit 1 to ensure that the licensee had implemented a structured Y2K program that addressed systems and components associated with all aspects of spent fuel storage, and verified that these systems were Y2K ready.

The inspector found that the licensee had implemented a structured Y2K program at the Millstone site. Specifically, the licensee's program addressed the requirements set forth in NRC Generic Letters (GL) 98-01, and 98-01, Supplement 1, "Year 2000 Readiness Of Computer Systems At Nuclear Power Plants." Although the GL set forth requirements for operating reactors only, the licensee included Unit 1 systems and components within the scope of their Y2K program. The licensee's Unit 1 review was limited to systems and components associated with all aspects of spent fuel storage, as well as Unit 1 systems that supported the continued operation of Units 2 and 3.

The licensee's Y2K program included organization and staffing, quality assurance measures, assessment of software applications and embedded devices, testing and validation, staff training, documentation, and contingency planning for both internal and external events. All Unit 1 applications and devices essential for safe storage of spent fuel, and to support the continued operation of Units 2 and 3, were found to be Y2K compliant. Site-wide processes that also effect Unit 1, such as communications and security, were also found to be Y2K compliant. The inspector also reviewed a number of systems that had been declared Y2K compliant, including fire water system, area radiation monitors, SFP temperature recorders, and the xenon-krypton/turbine building ventilation monitor recorders. The inspector found that the licensee had assessed these four systems in accordance with the appropriate procedures that had been established

for the Y2K program implementation. In addition, the licensee utilized existing processes, procedures and programs during the assessment process to determine Y2K compliance. For example, the corrective action program was utilized when adverse conditions were identified, i.e., condition reports were generated to implement and track the resolution of issues. While minor administrative discrepancies were identified during this review, these discrepancies had no impact on the overall Y2K status of the applicable devices. The inspector noted that the licensee encountered no Y2K problems during the actual transition into the year 2000.

c. Conclusions

The inspector concluded that the licensee had appropriately included Unit 1 within the scope of the site-wide Year 2000 (Y2K) Program, and all applications and devices associated with the safe storage of spent fuel were Y2K compliant.

#### **IV. Plant Support**

**R1 Radiological Protection and Chemistry (RP&C) Controls**

**R1.1 Personnel Radiation Protection and Contamination Control**

a. Inspection Scope (83750)

The inspector reviewed the licensee's planning for remediation work throughout the site, the radiation survey and contamination control programs, and dosimetry programs. The inspectors toured the radiological controlled areas (RCAs), reviewed radiological controls for various work conducted in the reactor building, and interviewed radiation protection personnel.

b. Observations and Findings

Standard procedures require that radiation workers wear protective clothing (PC) as specified by the Radiation Work Permit (RWP). The inspectors toured the reactor building and observed personnel removing insulation while wearing the requisite personal protective equipment. The inspectors observed individuals wearing external dosimeters and lapel air-monitors in certain areas where such monitoring was required. Individuals were also observed surveying pipe chases and equipment for removable contamination, using appropriate and calibrated radiation detection instrumentation.

In general, good radiological controls were taken to prevent the spread of potential contamination during the remediation work in the Reactor Building. Health Physics (HP) technicians were observed surveying various layers of insulation as it was removed from the piping, in accordance with procedures and the work order. Survey stations were located at the exit point of each restricted area. However, during the inspection period, the licensee identified that material had been transferred from the Unit 1 reactor building to a warehouse storage area that was later surveyed and found to be contaminated. Although the licensee determined that a thorough survey of the material was not

performed, no contaminations occurred during the transfer and the licensee resolved the issue and provided feedback to the HP staff.

The dosimetry program established by the licensee appears to be comprehensive and covers the entire site. Millstone Unit 1 Radiation Protection Services has entered into a service level agreement (SLA) with the site HP organization that services the entire site for HP technical support, dosimetry services, exposure record keeping/recording, and whole body counting. The duration of the current agreement is for one calendar year.

The inspector reviewed a sample of dose records from the licensee's electronic database system, for workers that require individual monitoring of external exposure. The information was clear, indicated the period of exposure, and the records appeared to be linked to the various RWPs under which the work was performed. During the inspector's review, no over-exposures had occurred at Unit 1 in 1999. The licensee also performs a monthly blind test with the whole body gamma thermoluminescent dosimeters (TLDs). Typically five TLDs are labeled and irradiated with randomly selected doses between 30 mRem and 1,000 mRem, and submitted for processing with other personnel TLDs. The calculated bias for 1999 revealed that the performance testing was within targeted specifications of 10 percent.

The inspector also noted that the licensee's dosimetry program was accredited by the National Voluntary Laboratory Accreditation Program, effective through December 31, 2000.

c. Conclusions

The licensee provided good radiological controls during the decommissioning work in the restricted and unrestricted areas. The licensee has established a comprehensive survey and dosimetry program that complements the ALARA program to minimize exposure.

R1.2 Postings and Labeling

a. Inspection Scope (83750)

A review was performed of the licensee's practices for posting and controlling access to high radiation areas (HRAs). Information was also gathered by reviewing RWPs and key control practices, conducting tours of the plant to evaluate radiological postings, observing work in progress, and through discussions with cognizant personnel.

b. Observations and Findings

The inspectors found the posting and labeling of radioactive materials areas, contamination controls, barriers for HRAs, information regarding dose rates in work areas, and access control to such areas, were generally good.

However, during the inspection period, the inspector identified a radioactive material boundary conservatively posted as a RCA. The licensee's conservative posting also contributed to poor work practices exhibited by licensee personnel, which included the

lack of personnel monitoring upon exiting the RCA, as required by both the RCA posting and unit procedures.

The inspector observed that the licensee had posted copies of NRC Form 3 in various locations throughout the site and these were visible to workers. In the reactor building, the inspector observed that areas around the southeast access to the torus area were posted with caution signs as required by 10 CFR 20.1902.

c. Conclusions

The licensee provided adequate radiation postings and labeling throughout the site. HRA access and radiation exposure controls were effectively implemented, as evidenced by use of postings, locked doors, and a well-trained radiation protection staff.

**R2 Status of RP&C Facilities and Equipment**

R2.1 Radioactive Waste Management

a. Inspection Scope (84750)

The inspector reviewed the licensee's management of radioactive waste processed from Unit 1. The inspector toured the radwaste processing area, performed a walk-down of portions of the liquid waste management system (LWMS), and interviewed the radwaste plant equipment operator.

b. Observations and Findings

The inspector toured the liquid radwaste facilities, incorporating a majority of the LWMS components including processing equipment, valves, piping, and instrumentation and controls, as well as the LWMS control room. The LWMS consists of four systems: three systems process and treat the various types of liquid radioactive wastes, and the fourth system is comprised of resin and filter slurry processing equipment.

At the time of the inspection, licensee management indicated that plans were being finalized to repair a leaking radwaste discharge line. As a result of the leak, processed radwaste had leaked into the floor drain system, overflowed into the southeast corner room of the reactor building, and subsequently contaminated the floor. The licensee took immediate action to address the leak and subsequent overflow, and also entered the condition into their corrective action program. The inspector was also informed by licensee management that the Radwaste and Engineering Departments were actively working to resolve issues associated with the LWMS that had been previously documented in NRC Inspection Report 50-245/99-09.

The inspector also observed the solid radioactive waste storage area. The waste was packed in 55-gallon drums, and most of the dry active waste (DAW) has decayed sufficiently to enable handling of the drums. The licensee staff has identified the decayed waste and plans to ship the waste off-site for disposal.

c. Conclusions

Acceptable engineering support was noted in the licensee's efforts to repair the waste discharge line and various other radwaste equipment. The inspector noted that the licensee staff worked well together in the identification of the project critical path, the resolution of emergent issues, and toward the ultimate resolution of the historical deficiencies of the LWMS.

**R8 Miscellaneous Radiological Protection and Chemistry Issues**

R8.1 ALARA Planning and Internal Dose Assessment

a. Inspection Scope (83750)

The inspectors reviewed the licensee's actions and dose assessment following preparation work in support of the control rod drive removal project.

b. Observations and Findings

The inspector reviewed the licensee's advance planning and job dose monitoring for the preliminary work involved in the CRDM removal project. The licensee applied ALARA principles to the planning process for the shootout steel removal job and determined in advance that the estimated total effective dose equivalent for workers would be less if the job was performed without respirators. This advance estimate included consideration of the possibility of internal dose due to inhalation or ingestion of airborne materials. Following the work, the licensee's personnel monitoring detected some internal deposition, as expected. The inspector reviewed the licensee's dose assessment and found it to be acceptable, with a maximum assigned dose of 24 mRem.

c. Conclusions

The licensee's ALARA program and advance planning to determine the approach to performing work for the shootout steel removal were good. The inspector identified no problems in the licensee's dose assessment methodology.

## R8.2 Personnel Contamination Events

### a. Inspection Scope (83750)

The inspector reviewed the licensee's controls following the personnel contamination events during the control rod drive removal project.

### b. Observations and Findings

During the removal of control rod drive support steel under the reactor vessel, a skin contamination occurred when the sleeve of a worker's protective clothing (PCs) slid up the arm and exposed the forearm. The licensee determined that the worker had failed to tape the sleeve of the PCs to the glove, as directed during the pre-job brief for the job. The inspector found that the RWP, which is required to be reviewed prior to entry into the RCA, did not contain the necessary instructions regarding the application of tape on all openings. Although the ALARA review performed in support of the RWP did contain instructions regarding the tape, the ALARA evaluation was not included with the RWP for review prior to entry into the RCA. Subsequently, the licensee instituted a change in policy to require ALARA evaluations which contain specific job controls to be included with future RWPs, and therefore required to be reviewed by the workers. The inspector found this corrective action acceptable. Once the contamination was identified, however, the licensee appropriately decontaminated the worker.

Facial contaminations also occurred due to the nature of the work under the reactor vessel, even though workers wore face shields. The workers were satisfactorily decontaminated by the licensee. The licensee also identified that workers had not performed a whole body frisk immediately upon exiting the drywell, as required by unit procedures. In addition, the workers subsequently performed whole body frisks with a personnel contamination monitor (PCM) commonly used inside the reactor building following the removal of PCs in the vicinity of the fourth floor dress-out area. The licensee identified that this particular PCM did not alarm since the alarm set point was adjusted above the level that would indicate contamination. The licensee subsequently briefed all radiation protection personnel regarding the requirement to perform a whole body frisk immediately upon exit from the drywell, and identified the fourth floor PCM as a "hot particle" monitor. The inspector found the licensee's corrective actions acceptable.

An internal exposure was also discovered following a positive exit whole body count (WBC) of a contractor who had worked under the reactor vessel. As a result, the licensee initiated evaluations of all workers that had worked in the same area, and identified additional internal depositions of cobalt-60 (total of five workers) with the highest exposure of 20 mRem, as well as a calculated alpha exposure (total of six workers) of 4 mRem. The inspector determined that the licensee appropriately responded to the initial positive WBC and the subsequent internal contaminations.

### c. Conclusions

The inspector concluded that the licensee adequately responded to contamination events that were identified during the control rod drive removal project. In addition, although minor inconsistencies in radiation protection documentation and communications were identified, these inconsistencies did not prevent the ultimate identification of the contaminations, and the licensee's corrective actions were considered acceptable.

## **P1 Conduct of Emergency Preparedness Activities**

### **P1.1 Response To Off-Site Fire**

#### **a. Inspection Scope (36801)**

The inspector reviewed the licensee's response to an off-site fire that occurred on a Millstone Station transmission line support pole.

#### **b. Observations and Findings**

On November 25, 1999, the Unit 1 control room was notified by the New England Independent System Operator (ISO-NE) regarding a fire on an off-site Millstone Station transmission line support pole, and the impending de-energization of two of four Millstone Station transmission lines. Subsequently, the Unit 1 control room staff notified the Unit 2 and 3 control rooms of the fire and transmission line de-energization, in accordance with existing Station procedures.

The inspector determined that the Unit 1 staff had appropriately responded to the off-site fire. However, during a subsequent debrief, the licensee identified a number of issues regarding procedural adequacy, communications, and other issues, that could potentially impact Units 2 and 3. For example, off-site entities (ISO-NE) had established Unit 1 as the lead unit for Station coordination of load reductions, which could be problematic given the decommissioning status of Unit 1. As a result, the licensee entered the issues identified following the off-site fire related to coordination between Station control rooms into their corrective action program for resolution.

#### **c. Conclusions**

The inspector concluded that the licensee responded appropriately to the off-site fire that affected Millstone Station transmission lines. In addition, the licensee had identified a number of improvements areas, including the impact of Unit 1 decommissioning on event coordination, which are being tracked in their corrective action program for resolution.



## **S1 Conduct of Security and Activities**

### **S1.1 De-Vitalization of Selected Unit 1 Areas**

The inspector reviewed the licensee's de-vitalization of various Unit 1 areas, which included the following: Gas Turbine Building, Reactor Building, Intake Structure, Cable Vault, 480V Switchgear Room, and Diesel Generator Room. The Control Room was not included, however, since the Unit 1 control room communicates with the Unit 2 control room. The inspector determined that the licensee's de-vitalization was acceptable, given the decommissioning status of the unit, the continued physical location of the SFP within the protected area (Reactor Building), and is consistent with the requirements as set forth in 10 CFR 73 and guidance contained in NRC Regulatory Guide 5.65, Section C.2.

## **S3 Security and Safeguards Procedures and Documentation**

### **S3.1 Review of Selected Security Procedures**

Subsequent to the closure of Unresolved Item (URI) 50-245/97-02-02, which was documented in NRC Inspection Report (IR) 50-245,336,423/99-09, the inspector identified corrective actions regarding security procedure revisions that provided incomplete guidance. Specifically, Security Department Instruction (SDI) 612, "Security Reports," contained instructions to assist various security personnel in the initiation of condition reports and licensee event reports, and emergency plan implementation for safeguards events. However, the guidance contained in SDI 612 was inconsistent with the applicable site-related programs or procedures, i.e., RP-4, "Corrective Action Program", for condition report initiation. The inspector subsequently reviewed the licensee's revisions to the SDIs and they were found acceptable.

## **V. Management Meetings**

## **X1 Meeting Summaries**

### **X1.1 Millstone 1 Decommissioning Advisory Committee**

The inspector attended the first two meetings of the Millstone 1 Decommissioning Advisory Committee (MIDAC) during the inspection period. The MIDAC is an advisory committee to the State of Connecticut's Nuclear Energy Advisory Council (NEAC), whose purpose is to enhance open communication, public involvement and education in matters relating to the decommissioning of Millstone Unit 1.

### **X1.2 NRC Meeting With Town of Waterford First Selectman**

On January 13, 2000, the resident inspector and Ronald Bellamy, Chief of the Decommissioning and Laboratory Branch, along with the Unit 2 and 3 Senior Resident Inspectors, and the Director, Millstone Inspections Directorate, met with the newly elected First Selectman for the town of Waterford, Connecticut. The informal meeting

was held to introduce the participants and to establish protocol for future communications between the First Selectman and the NRC.

X1.3 Exit Meeting

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on February 10, 2000. The licensee acknowledged the findings presented.

## **PARTIAL LIST OF PERSONS CONTACTED**

### Licensee

L. G. Temple, Unit 1 General Manager  
B. S. Ford, Director, Nuclear Safety and Regulatory Affairs  
D. A. Landeche, Director, Unit 1 Operations  
R. G. Fraser, Director, Unit 1 Decommissioning  
R. K. Doherty, Manager, Radiation Protection  
J. P. Veglia, Manager, Engineering Decommissioning, Unit 1  
A. F. Armagno, Supervisor, HP Services  
W. Spahn, Shift Manager  
D. Latz, Shift Manager  
R. Decensi, Manager, HP Support Services  
P. Simmons, Dosimetry  
T. Stafford, Supervisor, HP  
A. M. Johnson, Supervisor, HP Technical Support  
J. Aquitance, Jr., Supervisor, Maintenance Operations  
F. Neff, Radwaste Shift Manager  
I. Turner, HP Support Services  
G. Sturgeon, Training  
M. Hills, Project Manager  
R. Harnal, Project Manager  
J. Campbell, Security  
S. Thickman, Licensing  
I. Haas, Site Health Physics  
M. Legg, System Engineer  
P. Quinlan, Engineering Support

## **INSPECTION PROCEDURES USED**

71707	Plant Operations
71801	Decommissioning Performance and Status Review
60710	Fuel Handling Activities
60801	Spent Fuel Pool Safety
71714	Cold Weather Preparations
42700	Plant Procedures
TI 2561/003	Re-Examination of Year 2000 (Y2K) Program activities at Selected Decommissioning Reactors
83750	Occupational Rad. Exposure
36801	Org., Management and Cost Controls

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

NCV 50-245/99-13-01 Stack Gas Sample Flow Surveillance Missed

### Closed

NCV 50-245/99-13-01 Stack Gas Sample Flow Surveillance Missed  
LER 50-245/96-33-00 Cont Rm Exh Fans Fail/Trip Aft Radia Cont Rm Isol Signal  
LER 50-245/96-33-01 CR Exhaust Fans Fail to Trip After Hi Rad CR Isol Signal  
LER 50-245/96-34-00 Refuel Floor Rad Monitor Part Blocked by Shield Plug  
LER 50-245/96-42-00 Stack Gas Sample Flow Surveillance Missed  
LER 50-245/96-43-00 Inadequate Instrument Calibrations  
LER 50-245/96-65-00 Liquid RW Effluent Line Monitor not set per Req of TS  
LER 50-245/97-19-00 Liquid Discharge w/o SW or Recirc Water Available  
LER 50-245/97-20-00 Liq RW Eff Mon Func Test Surv NIAW TS  
LER 50-245/97-33-00 Unmonitored Airborne Radioactivity Release Paths  
LER 50-245/97-37-00 Unmonitored Release Path Due to Rad Ash in House Heat Boil  
LER 50-245/99-01-00 Stack Gas Sample Flow Surveillance Missed

### Discussed

URI 50-245/97-02-02 RP-4 Interface with Lower Tier Reporting Processes

## LIST OF ACRONYMS USED

ALARA	As Low As is Reasonably Achievable
CFR	Code of Federal Regulations
CRDM	Control Rod Drive Mechanism
DAW	Dry Active Waste
DFP	Diesel Fire Pump
GL	Generic Letter
HP	Health Physics
HRAs	High Radiation Areas
LERs	Licensee Event Reports
LWMS	Liquid Waste Management System
MIDAC	Millstone 1 Decommissioning Advisory Committee
NCV	Non-Cited Violation
NEAC	Nuclear Energy Advisory Council
NFSV	New Fuel Storage Vault
PC	Protective Clothing
PDR	Public Document Room
PDTs	Permanently Defueled Technical Specifications
RCAs	Radiological Controlled Areas
RP&C	Radiological Protection and Chemistry
RWP	Radiation Work Permit
SDI	Security Department Instruction
SERT	System Evaluation Re-Characterization Team
SFP	Spent Fuel Pool
SLA	Service Level Agreement
SSCs	Structures, Systems and Components
TI	Temporary Instruction
TLDs	Thermoluminescent Dosimeters
TS	Technical Specifications
WBC	Whole Body Count
Y2K	Year 2000